Lexium MDrive®

Simplifying machine building with compact integrated motors

Pulse/Direction version

Integrated stepper motors with 4 operating modes – pulse/direction, speed, torque and velocity control – and closed loop performance

CE RoHS REACH

Intelligent motion systems | Schneider Electric

Description

Lexium MDrive® Pulse/Direction

Modes: pulse/direction, speed, torque, velocity
integrated 2-phase stepper motor

CE RoHS REACH

1 rotary stepper motor with premium high torque motor option
2 microstepping drive
3 4 operating modes
4 4 I/O lines
5 internal encoder option
6 closed loop performance

Product offer

Lexium MDrive® Pulse/Direction products integrate a hybrid 1.8° 2-phase stepper motor with on-board drive electronics, and closed loop performance with internal encoder option. Products operate in 4 modes: pulse/direction input, variable speed control, constant velocity drive, and variable torque control in closed loop products only. Operating in pulse/direction mode requires a separate motion control master.

Lexium MDrive Pulse/Direction products have an RS-422/485 serial interface. Product commissioning, parameterization and monitoring are accomplished via a user-friendly software GUI, included free as part of the Lexium MDrive Software Suite. Settings can be downloaded and stored in the product's nonvolatile memory.

Closed loop products are equipped with 1000 line (4000 count/rev) encoders internal to the unit, requiring no extra space in an application. Using the encoder to monitor motor shaft position, real time closed loop feedback is accomplished with hMTechnology.

Unlike traditional motor systems, hMT combines the best of servo and stepper motor technologies, while delivering unique capabilities and enhancements over both, including:
- real time closed loop control
- no loss of synchronization/stalling
- full use of motor torque
- torque mode control

Application areas

Lexium MDrive Pulse/Direction products are ideal for machine builders who want a robust motor with integrated electronics. Reduced sysem cabling can minimize problems due to electrical noise. While closed loop products deliver enhanced performance and provide a lower cost option to servo motors in many applications.

Lexium MDrive products are compact motion control solutions that can reduce system cost, design and assembly time for a wide range of motion applications.

Features

new option Premium High Torque Motors

- Integrated microstepping drive and hybrid 1.8° 2-phase NEMA stepper motor
  - Standard motors available in NEMA 17, 23 & 34 sizes
  - Optional premium high torque motors available in NEMA 23 size
  - All motors available in 3 stack lengths: single, double and triple
- Open loop control
  - Pulse/direction input
  - Variable speed control
  - Constant velocity drive
- Closed loop control with 1000 line internal encoder and hMTechnology (optional)
  - Torque mode control
  - Prevents motor stalling while delivering numerous performance advantages
- Advanced current control for exceptional performance and smoothness
- RS-422/485 serial interface
- +12 up to +70 VDC input power range
- Cost effective
- Extremely compact
- 20 microstep resolutions to 51,200 steps/rev including: Degrees, Metric, Arc Minutes
- 0 to 2.56 MHz step clock rate selectable in 0.59 Hz increments
- Graphical user interface provided for quick and easy configuration
- Extended 4 year product warranty

Lexium MDrive® Pulse/Direction

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Specifications

			LM•P42 (NEMA17)	**LM•P57** (NEMA23)	**LM•P85** (NEMA34)
Input power	Voltage		+12…+48 VDC	+12…+60 VDC	+12…+70 VDC
	Current maximum *(1)*		2.0 A	3.5 A	4.0 A
Motor	Premium high torque motor	Option	no	yes	no
Thermal	Operating temp non-condensing	Heat sink maximum	85°C		
		Motor maximum	100°C		
Protection	Type	Temp warning	0…84°C, user selectable		
		Earth grounding	via product chassis ground lug		
		IP rating	IP20		
Signal inputs	Number		2		
	Voltage range, isolated		+5…+24 VDC sourcing or sinking		
Analog input	Number		1		
	Resolution		12 bit		
	Voltage range		0…+5 VDC, 0…+10 VDC, 0…20 mA, 4…20 mA		
Attention output	Current	Open collector/emitter	5.5 mA		
	Voltage	Open collector	+60 VDC		
		Open emitter	+7 VDC		
Communication	Type		RS-422/485		
	Baud rate		4.8…115.2 kbps		
Motion	Microstep resolution	Number of settings	20		
		Steps per revolution	200, 400, 800, 1000, 1600, 2000, 3200, 5000, 6400, 10000, 12800, 20000, 25000, 25600, 40000, 50000, 51200, 36000 (0.01 deg/µstep), 21600 (1 arc minute/µstep), 25400 (0.001mm/µstep)		
	Open loop configuration	Operating modes	pulse/direction, speed control, velocity mode		
	Closed loop configuration, requires LMD with encoder	Operating modes	pulse/direction input, variable speed control, constant velocity mode, variable torque mode		
	Encoder	Line count	1000 lines (4000 edges per rev)		
		Style	internal, magnetic		
		Ouputs	6 TTL level compatible		
	Digital filter range		50 nS…12.9 µS (10 MHz…38.8 kHz)		
	Clock types (step mode)		Step/direction, quadrature, step up/step down, clockwise/counterclockwise		
	Step frequency	Maximum	2.56 MHz		
		Minimum pulse width	100 ns		

(1) Actual power supply current will depend on voltage and load.

Setup parameters *(2)*

			Overview
Operating modes	Basic	Pulse/direction	microstep resolution, run current, hold current, hold delay, clock mode, motion, enable active, input filters
	Advanced	Speed control	acceleration, decelaration, velocity, flags
		Torque mode *(3)*	set torque speed, % maintained motor torque, torque current, filtering
		Velocity control	acceleration, decelaration, velocity, slew, flags
Device parameters	Analog input settings		select range and resolution
	Communication bus settings		set baud rate, enable/disable party mode and features, check sum
	I/O settings		clock and filter settings, attention output with selectable pre-programmed fields
	Motion settings		select motion, analog and velocity settings as available by operating mode
	hMT settings *(3)*		hMT setup/status; hMT operation
Device ID			device information, restore settings

(2) Refer to the LMD Software Suite Manual for details.
(3) Only with Lexium MDrive closed loop/encoder products.

An optional Communication Converter is recommended with first orders.

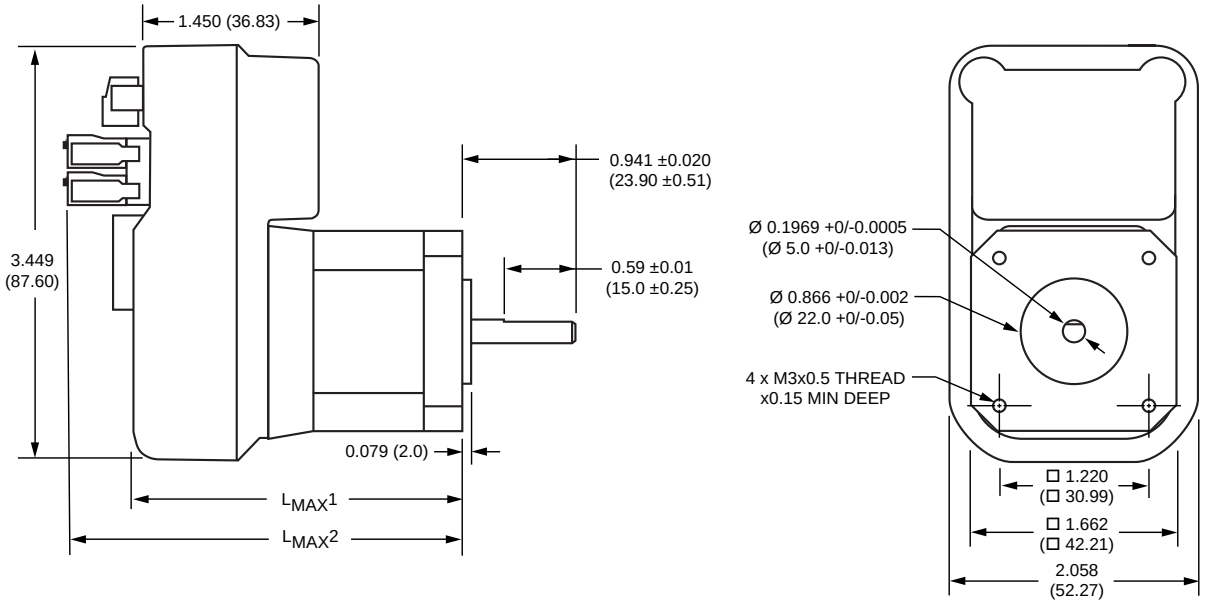
See User Manual for complete details: motion.schneider-electric.com/manuals.html

Lexium MDrive® Pulse/Direction

Modes: pulse/direction, speed, torque, velocity
integrated 2-phase stepper motor

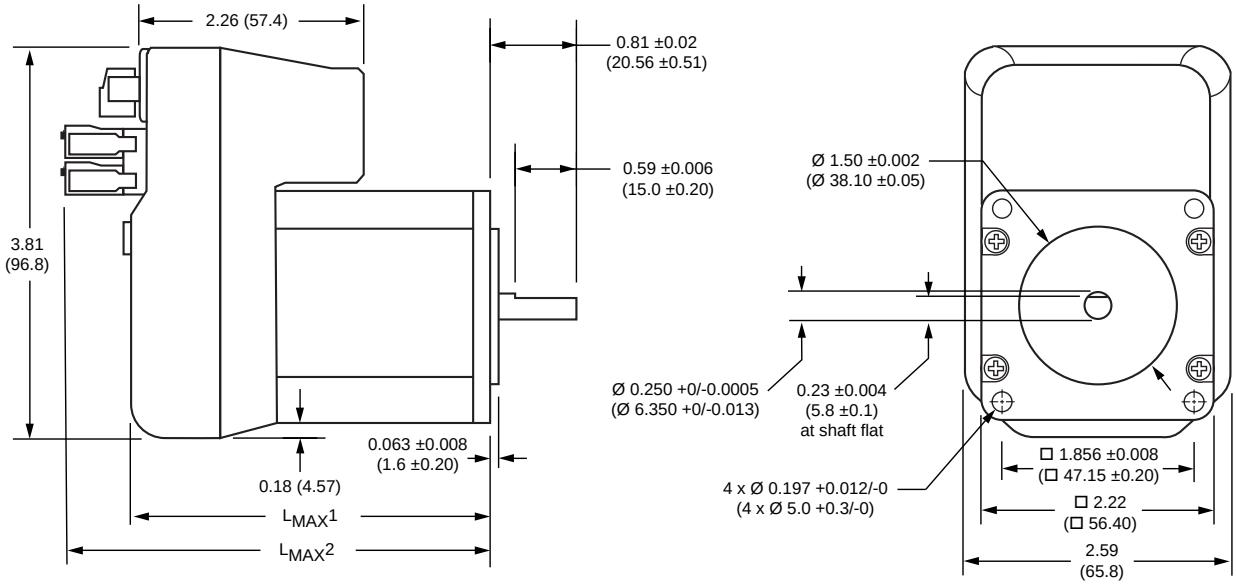
Dimensions in inches (mm)

LM•42 NEMA17 motor



Motor stack length	Lmax1	Lmax2
Single	2.40 (61.0)	3.22 (81.8)
Double	2.64 (67.0)	3.46 (88.0)
Triple	2.96 (75.3)	3.78 (96.0)

LM•57 NEMA23 motor



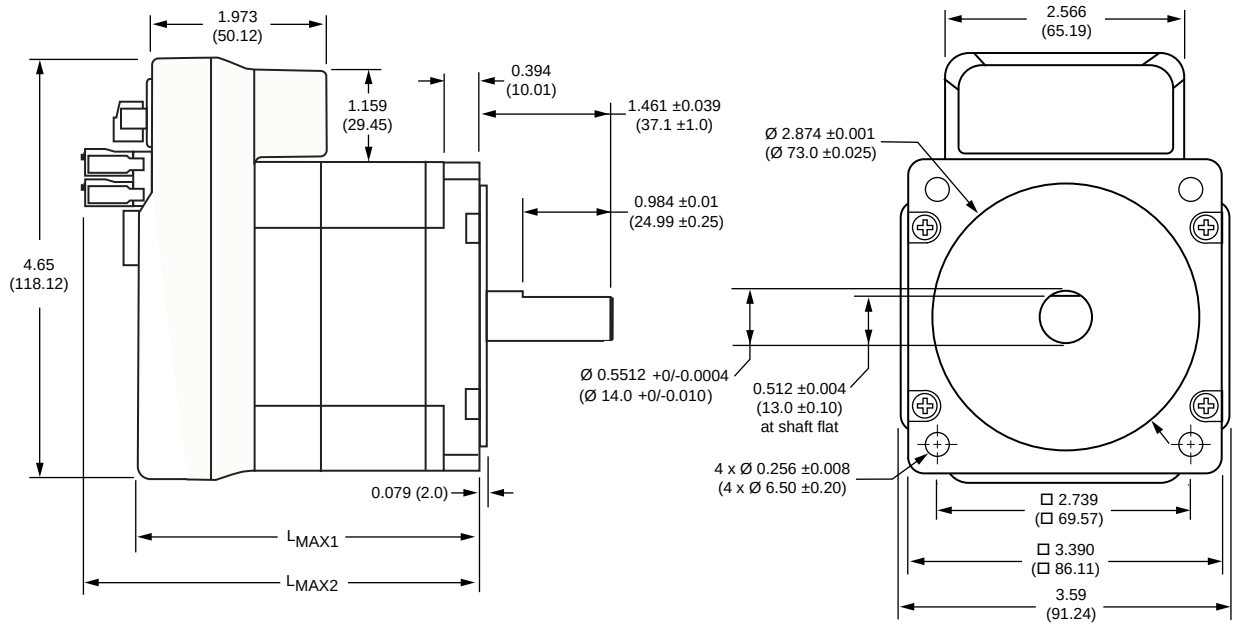
Motor stack length	Lmax1		Lmax2	
	Standard Motor	High Torque Motor	Standard Motor	High Torque Motor
Single	3.17 (80.5)	3.32 (84.3)	3.91 (99.3)	4.01 (101.8)
Double	3.52 (89.4)	3.73 (94.8)	4.26 (108.2)	4.36 (110.7)
Triple	4.38 (111.3)	4.60 (116.8)	5.13 (130.3)	5.23 (133.0)

Lexium MDrive® Pulse/Direction

Modes: pulse/direction, speed, torque, velocity
integrated 2-phase stepper motor

Dimensions in inches (mm)

LM•85 NEMA34 motor

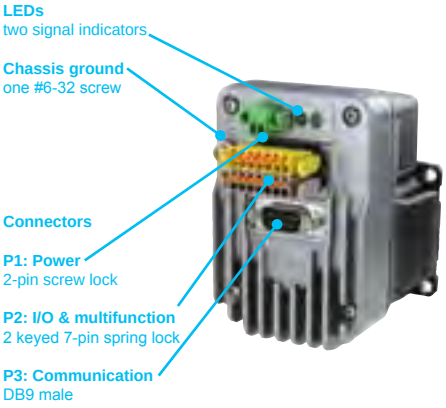


Motor stack length	Lmax1	Lmax2
Single	3.76 (95.5)	4.41 (112.0)
Double	4.33 (110.0)	4.98 (126.5)
Triple	5.90 (149.9)	6.55 (166.4)

See User Manual for complete details: motion.schneider-electric.com/manuals.html

Lexium MDrive® Pulse/Direction

Modes: pulse/direction, speed, torque, velocity
integrated 2-phase stepper motor



Software interface

The free Lexium MDrive Software Suite includes a user interface GUI for product commissioning and programming via a PC.

PC interface is easily accomplished using the USB to RS-422/485 communication converter MD-CC404-000. Compatible with 32- and 64-bit Windows, Mac OS, and Linux operating systems. Each comm converter includes a 6.0'/1.8m cable with DB9 mating connectors.

Connectors

All Lexium MDrive connectors are conveniently grouped in the same location at the back of each product. The same style locking connectors are also used consistently on all motor sizes of Lexium MDrive products.

Mating connectors for P1 and P2 are provided, and extra connectors may be ordered. A #6-32 screw lug is provided for earth grounding.

Connector	Style	Assignment
P1	2-pin screw lock	Supply voltage
P2	2 keyed 7-pin spring lock, color coded for ease of use	Multifunction interface
P3	DB9 male	Communication
Chassis ground	#6-32 screw lug	Earth grounding

Status indicators

Lexium MDrive products include 2 LED signal indicators. The multi-color LEDs are programmed to indicate a range of pre-defined messages to aid users. See product user manual for details.

Lexium MDrive® Pulse/Direction

Modes: pulse/direction, speed, torque, velocity
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LM•P85 *LM•P57* *LM•P42*

Part numbers

Example	L	M	D	C	P	4	2	1
Product **LM** = Lexium MDrive	**L**	**M**	D	C	P	4	2	1
Motor **D** = hybrid stepper, 1.8° **H** = high torque stepper, 1.8° *(1)*	L	M	**D**	C	P	4	2	1
Control type **C** = Closed loop / with hMT and encoder *(2)* **O** = Open loop / no hMT or encoder	L	M	D	**C**	P	4	2	1
Communication type **P** = Pulse/Direction via RS-422/485 serial interface	L	M	D	C	**P**	4	2	1
Flange size **42 =** NEMA 17 / 42mm **57 =** NEMA 23 / 57mm **85 =** NEMA 34 / 85mm	L	M	D	C	P	**4**	**2**	1
Motor length **1** = single stack **2** = double stack **3** = triple stack	L	M	D	C	P	4	2	**1**

(1) Premium high torque motor option only available in NEMA 23 size.

(2) Closed loop control delivers encoder feedback and hMT enhanced motor performance..

MD-CC404-000

Installation accessories

Description	Length m	Length feet	Reference
Communication converter, USB to RS			
USB-pluggable converter to set/program communication parameters in 32- or 64-bit. Includes pre-wired DB9 mating cable.			
■ For all RS-422/485 products	1.8	6.0	**MD-CC404-000**

Description	Quantity	Reference
Mating connector kit		
Mating connectors for power and multifunction interface are included with each new product. If additional mating connectors are needed for Lexium MDrive Pulse/Direction products, a single mating connector kit is offered which includes the following:		**CK-14**
■ 2-pin screw lock mate (DC voltage supply)	1 pc	
■ 7-pin locking mates (multifunction), keyed	2 pcs - 1 yellow , 1 gray	

Lexium MDrive®
Motor specifications

LM•42 NEMA 17 motor specifications

Motor	Stack length	Single	Double	Triple
Holding torque	oz-in	43.9	58.1	87.8
	N-cm	31	41	62
Detent torque	oz-in	1.7	2.1	3.5
	N-cm	1.2	1.5	2.5
Rotor inertia	oz-in-sec^2	0.0005	0.0008	0.0012
	kg-cm^2	0.038	0.057	0.082
Radial load limit, center of shaft	lbs	8.5	8.5	8.5
	kg	3.8	3.8	3.8
Axial load limit @ 1500 rpm (5000 full steps / sec)	lbs	10	10	10
	kg	4.5	4.5	4.5
Weight (motor+driver)	oz	13.6	16.0	18.4
	g	385	454	522

LM•57 NEMA 23 motor specifications

Motor *(1)*	Stack length	Single		Double		Triple	
	Torque level	STD	HIGH	STD	HIGH	STD	HIGH
Holding torque	oz-in	103.4	152.0	158.6	264.0	242.2	416.0
	N-cm	73.0	107.0	112.0	186.0	171.0	294.0
Detent torque	oz-in	3.9	8.5	5.6	14.2	9.72	21.2
	N-cm	2.7	6.0	3.9	10.0	6.86	15.0
Rotor inertia	oz-in-sec^2	0.0025	0.0019	0.0037	0.0030	0.0065	0.0065
	kg-cm^2	0.18	0.14	0.26	0.22	0.46	0.46
Radial load limit, center of shaft	lbs	15	15	15	15	15	15
	kg	6.8	6.8	6.8	6.8	6.8	6.8
Axial load limit @ 1500 rpm (5000 full steps / sec)	lbs	20	20	20	20	20	20
	kg	9	9	9	9	9	9
Weight (motor+driver)	oz	26.4	26.4	31.2	31.2	44.0	44.0
	g	748	748	885	885	1247	1247

LM•85 NEMA 34 motor specifications

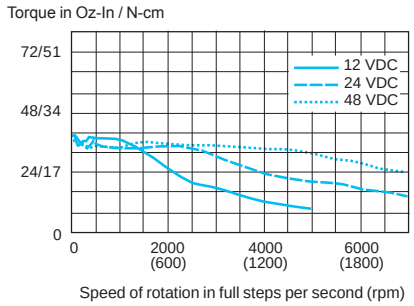
Motor	Stack length	Single	Double	Triple
Holding torque	oz-in	336.0	480.0	920.0
	N-cm	237.0	339.0	650.0
Detent torque	oz-in	10.9	14.16	19.83
	N-cm	7.7	10.0	14.0
Rotor inertia	oz-in-sec^2	0.0127	0.0191	0.0382
	kg-cm^2	0.90	1.35	2.70
Radial load limit, center of shaft	lbs	65	65	65
	kg	29.4	29.4	29.4
Axial load limit @ 1500 rpm (5000 full steps / sec)	lbs	20	20	20
	kg	9	9	9
Weight (motor+driver)	lb	4.45	5.65	9.0
	kg	2.02	2.56	4.08

(1) Available motors include STD/Standard and HIGH/High Torque

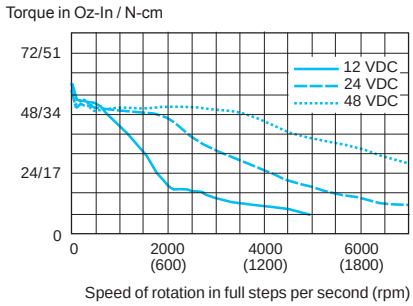
Lexium MDrive®
Speed torque characteristics

LM•42 NEMA 17 speed torque *(1)*

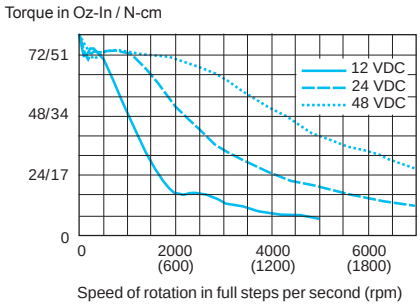
Single stack length



Double stack length

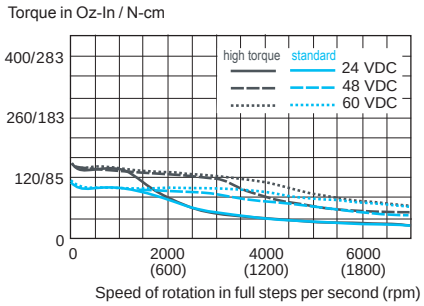


Triple stack length

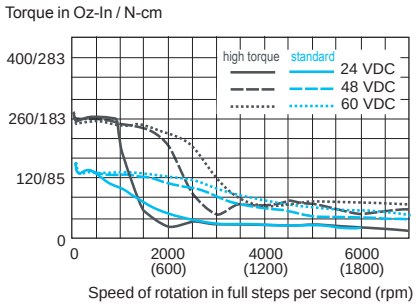


LM•57 NEMA 23 speed torque *(1)*

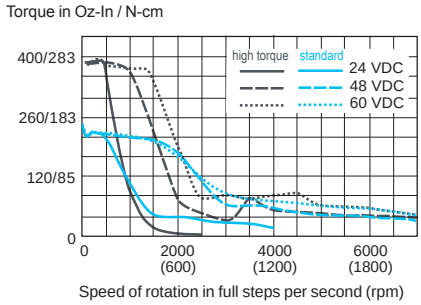
Single stack length



Double stack length

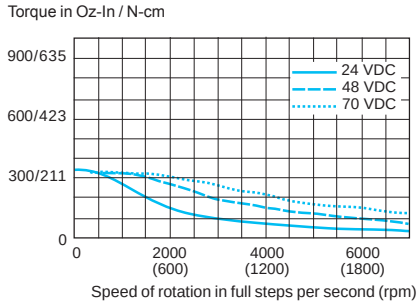


Triple stack length

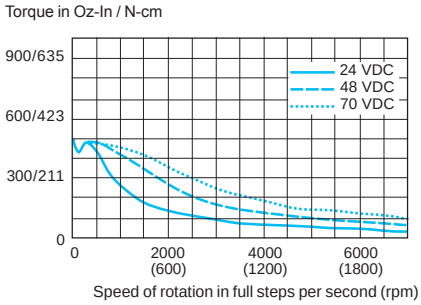


LM•85 NEMA 34 speed torque *(2)*

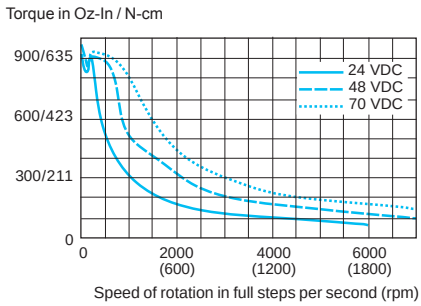
Single stack length



Double stack length



Triple stack length



(1) Test conditions: 100% current, 0.84 oz. damper, 0.18589 oz-in² inertia, hMT off
(2) Test conditions: 100% current, 3.7 oz. damper, 4.75670 oz-in² inertia, hMT off

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